

SHAW FARM BRIDGE

Spanning the Chippewa River at County Trunk Highway E
Island Lake Vicinity
Rusk County
Wisconsin

HAER No. WI-73

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PHOTOGRAPHS

WRITTEN HISTORICAL AND DESCRIPTIVE DATA

HISTORIC AMERICAN ENGINEERING RECORD
Rocky Mountain Regional Office
National Park Service
P.O. Box 25287
Denver, Colorado 80225-0287

HISTORIC AMERICAN ENGINEERING RECORD

SHAW FARM BRIDGE

Location: Spanning the Chippewa River at County Trunk Highway E,
Rusk County, Wisconsin

Quad: Flambeau Ridge, Wisconsin

UTM: 15:638230:5017295

Date of Construction: 1923

Present Owner: Rusk County

Present Use: Vehicular highway bridge, scheduled for replacement in the near future

Significance: The Shaw Farm Bridge is an excellent example of a steel, rigid-connected, Pratt through truss designed by the Wisconsin State Highway Commission. Built in 1923, it is one of only fourteen remaining examples built during the early period (1911-1925) of standardized design in Wisconsin. In its design and material, the Shaw Farm Bridge exemplifies a once common bridge type. As one of the few remaining structures of this type, the bridge has been declared eligible for the National Register of Historic Places.

Historians: Deanne L. Zibell and Chad J. Perkins
Hess, Roise and Company, Minneapolis, Minnesota
November 1994

The Shaw Farm Bridge (WisDOT ID P-54-42) consists of three virtually identical, steel, eight-panel, riveted, Pratt overhead trusses. The 128' trusses form a structure about 386' long with a 17' roadway. Two open concrete piers support span ends midstream; each has a pointed steel breakwater on the upstream side.

The bridge was built according to standard Wisconsin State Highway Commission (SHC) plan A38, a 1915 drawing for a 128' span with an 18' roadway (Figure 1). Specific details for this bridge were included in standard plan X677, "General Plan & Pier Details for the Shaw Farm Bridge," dated 1 March 1923 (Figure 2). The upper chord and inclined end post consist of two channels tied with a cover plate and V-lacing; the lower chord is made up of back-to-back angles with batten plates. Vertical members are back-to-back channels tied with V-lacing; diagonals are two angles with batten plates. The movable end at the south end of each span features rocker bearings. The reinforced concrete deck and curb rest on I-beam stringers, which are bolted to I-beam floor beams. All other intersections are field riveted. Portal bracing is angle A-bracing, and sway bracing consists of two pairs of angles with X-lacing. The top laterals are crossed flat bars, and the bottom laterals are crossed angles. Abutments, piers, back, and wing walls are all concrete. Rails consist of two channels supported by angle posts along the edge of the roadway.¹

¹For original plans, see Wisconsin Highway Commission, "Steel Highway Bridge," A38 (20 October 1915); "General Plan & Pier Details for the Shaw Farm Bridge," X677 (1 March 1923); and Wausau Iron Works, "Erection Plan for Shaw Farm Bridge over Chippewa River," 15 June 1923; microfilm copies at Wisconsin Department of Transportation, Madison. Field inspection by Charlene K. Roise, 23 August 1992, and Deanne L. Zibell, 12 November 1992.

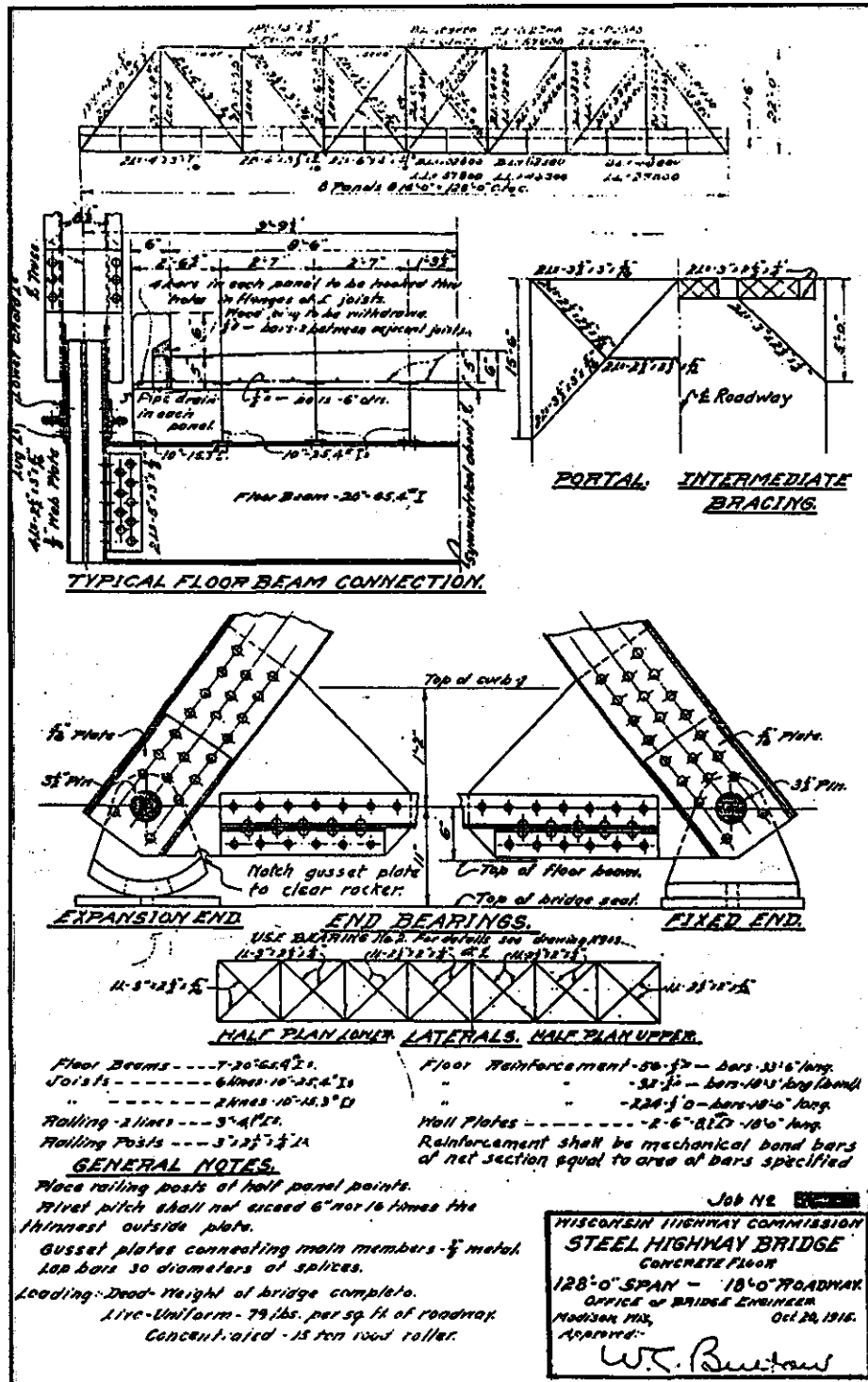


Figure 1: Wisconsin Highway Commission, "Steel Highway Bridge," A38.

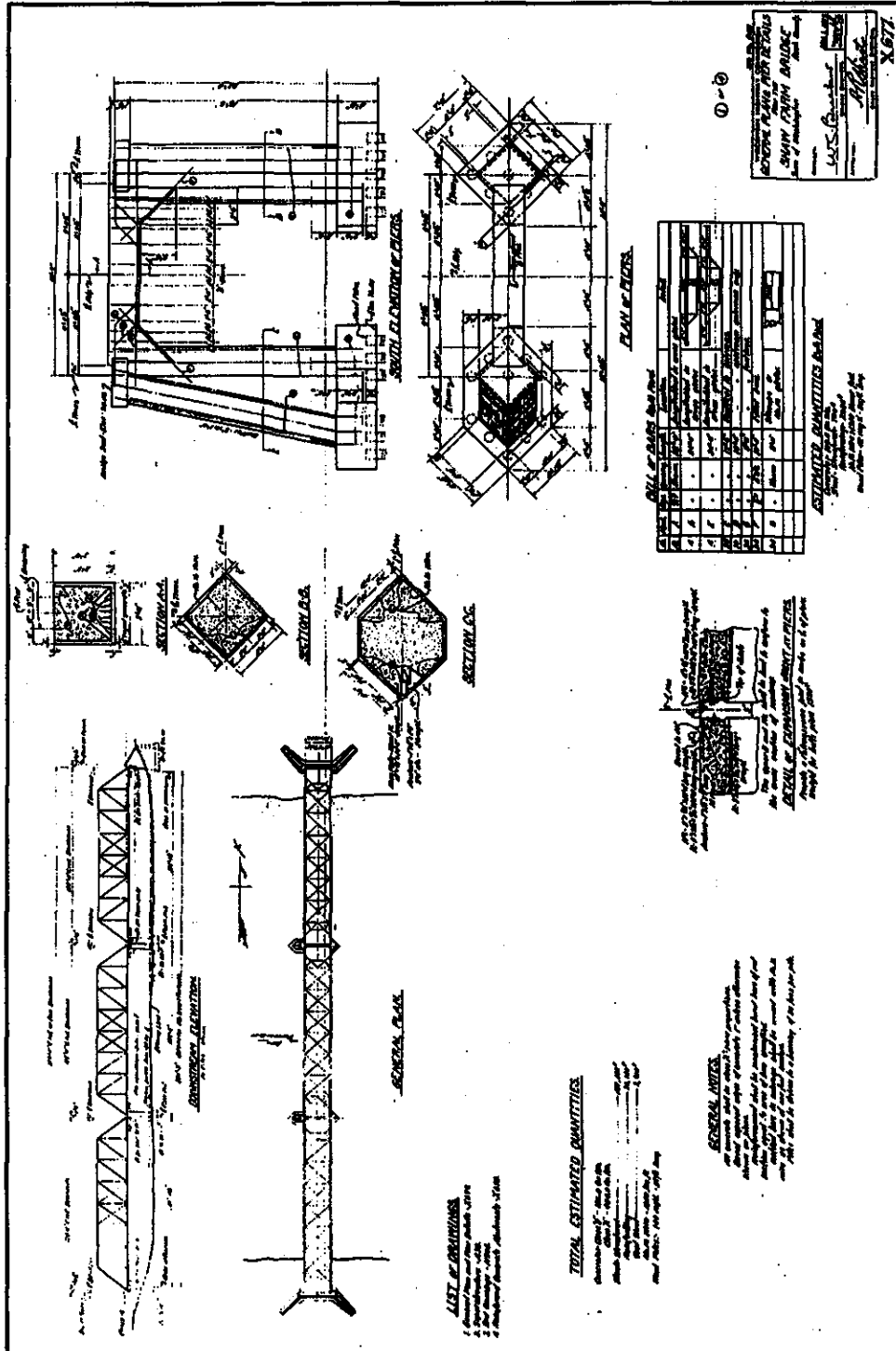


Figure 2: Wisconsin Highway Commission, "General Plan & Pier Details for the Shaw Farm Bridge," X677.

The Rusk County Board of Supervisors voted to construct this bridge 29 November 1922 after agreeing that the existing wood and steel bridge at this site was in dangerous condition. The Board issued \$30,000 in bonds to pay for the structure. On 23 April 1923, the Road and Bridge Committee awarded the contract to the G.E. Worden Company of Eau Claire, which submitted the lowest bid of \$32,554.² At the same time, the board borrowed \$4000 to cover the final cost of the bridge.

Erection plans for the Shaw Farm Bridge were prepared by Wausau Iron Works of Wausau, Wisconsin (Figure 3).³ This indicates one of two possibilities. Either the G.E. Worden Co., which was not listed in Eau Claire city directories for 1921 or 1923, was determined not to be qualified, and the project was given to the Wausau Iron Works, the next lowest bidder; or the G.E. Worden Company contracted with Wausau Iron Works to fabricate the bridge and did indeed put the bridge up according to Wausau Iron Works plans. Little is known about G.E. Worden, who was apparently a local Eau Claire contractor. Wausau Iron Works was established in 1908, and became one of the most prolific builders of bridges in Wisconsin until it dropped this part of its operation in 1933.⁴

²Record of Proceedings, Rusk County Board of Commissioners, Book 3, page 417 (29 November 1922), located at the Rusk County Courthouse, Ladysmith, Wisconsin; "Chippewa Bridge Bid in at \$32,554," Rusk County Journal, 26 April 1923, 1. There is a discrepancy between the headline and the article; the article states that the G.E. Worden Co. bid was \$32,654. To further complicate matters, the Ladysmith News-Budget of that same week lists the "H.E. Warden Co. of Eau Claire" as the builder. See "Three New Bridges to be Built," Ladysmith News-Budget, 27 April 1923, 1.

³Wausau Iron Works, "Erection Plan for Shaw Farm Bridge over Chippewa River," 15 June 1923.

⁴Richard W. Dexter to David Pantzlaff, 23 July 1992; "LOED Corporation History," 1.

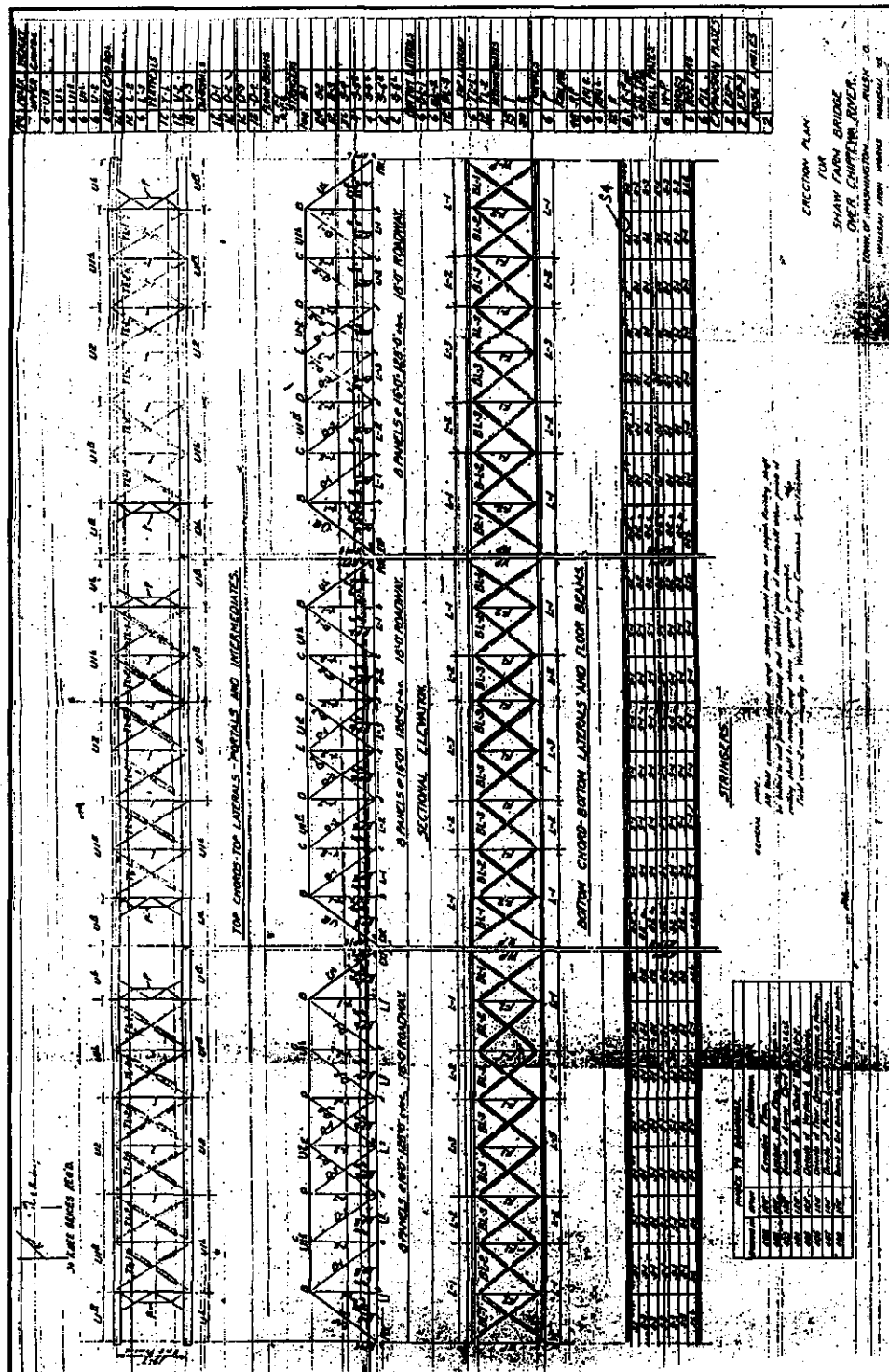


Figure 3: Wausau Iron Works, "Erection Plan for Shaw Farm Bridge Over Chippewa River."

The Shaw Farm Bridge, also known as the County Trunk Highway E Bridge, has been determined eligible for the National Register of Historic Places under Criterion C, embodying the distinctive characteristics of a type, period, and method of construction. The structure exemplifies a once relatively common truss type, the overhead riveted Pratt, of which few now survive in the state. The design features an early standard plan of the SHC, with three spans of sizable length. Moreover, it is the work of a prominent Wisconsin firm, the Wausau Iron Works, which fabricated and erected a number of bridges in Wisconsin from 1910 to 1933.

Originally known as the Shaw Farm Bridge, this structure carries County Trunk Highway E, a paved county route, over the Chippewa River near the confluence of the Chippewa and Flambeau rivers in southern Rusk County (Figure 4). The watershed area served by the Chippewa includes about seven million acres in the northwestern quarter of Wisconsin. The river's source is to the north, near the border between Sawyer and Ashland Counties. It drains into the Mississippi River downstream from Pepin, Wisconsin. The Chippewa was named after the Native American tribe inhabiting the area when Anglo-American explorers first visited the region in the seventeenth century. Few non-Natives settled in the area until the early to mid-1800s, when the region's vast forests attracted the attention of the lumber industry. Rusk County was established in 1905, when Gates County was renamed to honor Jeremiah McLain Rusk, the governor of the state from 1882-1889.⁵

⁵Details on watershed and early exploration and settlement provided in Chippewa County, Wisconsin: Past and Present (Chicago: S.J. Clarke Publishing Co., 1913), 84-93. For general historical information on the region, see George Forrester, ed., Historical and Biographical Album of the Chippewa Valley, Wisconsin (Chicago: A. Warner, 1891-2). For brief information on the history of Rusk County, consult the Inventory of the County Archives of Wisconsin, No. 54, Rusk County, prepared by the Works Progress Administration (Madison: Historical Records Survey, 1939).

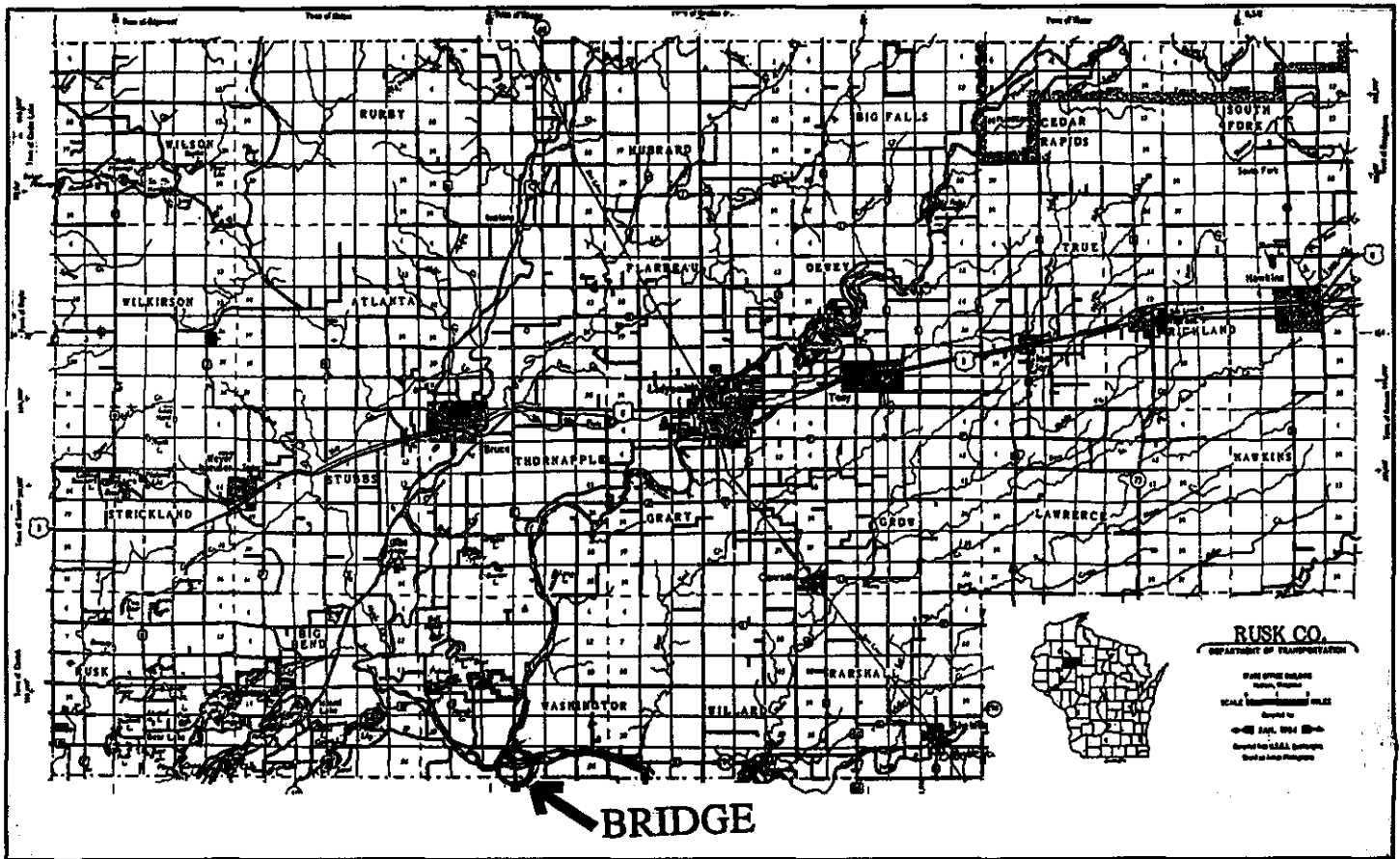


Figure 4: Location of Shaw Farm Bridge, Washington Twp., Rusk Co., Wisconsin

The confluence of the Flambeau and Chippewa rivers had long been an important meeting point for trappers and traders. An 1888 plat book indicates a ferry at the site of the Shaw Farm Bridge, joining two important county roads. What is now County Trunk Highway E ran north-south along the west embankment of the Flambeau River; the other road (now County Trunk Highway D) runs parallel to the Chippewa River along its south embankment.

This plat book also shows that the ferry connected two parts of the extensive Daniel Shaw Lumber Company holdings in the area. In fact, Shaw's lumber crew staging area (known as the Flambeau Farm) was located on the hill just south of the crossing, and consisted of a large hotel, three barns for the logging horses, a stone ice house, a store, and a large water tower, among other structures. Flambeau Farm was established in the 1860s, and served mainly as the food supply center for lumber camps further up both rivers and as a stopping point along the Flambeau trail for lumberjacks and traders. The farm was a center of activity in the area, especially after the company established a general store at the farm so that lumberjacks could buy necessities. Soon, though, the store was also serving small-scale farmers, and it became a profitable subsidiary of the logging operations. The store was not the only money-making business in the area. Local history tells of the thirsty lumbermen who could not drink during the logging season. When they returned to Flambeau Farm in early spring to wait for transportation back home, the lumberjacks were paid for the winter's work, and they would build a shack just south of the bridge where an enterprising local man would sell liquor.⁶

⁶Plat Book of Chippewa County, Wisconsin (Minneapolis: C.M. Foote & Co, 1888), 51; information on Flambeau Farm from A. R. Reynolds' The Daniel Shaw Lumber Company (New York: New York University Press, 1957), 47-50, and from Malcolm Rosholt's Lumbermen on the Chippewa (Rosholt, WI: Rosholt House, 1982) 281, 284; anecdotal information from interviews by Deanne L. Zibell with Gayle McEathron, 13 November 1992, and Joanne Plater, 13 November 1992.

Before the turn of the twentieth century, the ferry was replaced by a wood, two-span, Parker through truss, which was built on concrete piers just east of the present bridge; pieces of the pier and the abutments are still visible. Also by this time, another bridge crossing the Chippewa River about two miles downstream provided an additional north-south crossing of the river, and linked the road running along the northern embankment of the Chippewa to the one parallel to the south.⁷

Since the wood bridge had become dangerously unstable, the Shaw Farm Bridge was built in 1923. The bridge is surrounded by hilly farmland; a bar, resort, and mobile home park are located just north of the bridge. The final remains of the Shaw Farm were torn down in the 1950s.

The Shaw Farm Bridge consists of three Pratt, overhead truss spans. This design, patented by Thomas and Caleb Pratt in 1844, features vertical members in compression and diagonal members in tension.⁸ The design was originally built of wood and iron with pin connections at panel intersections. Steel was more commonly used by the late nineteenth century as improved production methods lowered costs. Riveting, which offered a stiffer and stronger connection, became popular for short to mid-span bridges in the early twentieth century with the improvement of field riveting techniques. The Worden-Allen Company erected the first known riveted Pratt overhead truss in Wisconsin in 1909. In 1912, the design was included in the

⁷Paul Faust and Julius Jungblut, Plat Book of Gates County, Wis. (Milwaukee: n.p., n.d.); and Plat Book of Rusk County, Wisconsin (Milwaukee: n.p., 1915).

⁸Donald C. Jackson, Great American Bridges and Dams (Washington, D.C.: Preservation Press), 24.

SHC's set of standard plans.⁹

Constructed in 1923, the Shaw Farm Bridge is an excellent example of the earliest phase of the SHC's program to create a uniform system of highway bridge construction in Wisconsin. This program began in 1911, when the SHC prepared a series of standardized bridge plans for use in projects receiving state and county financial aid. For spans of 80' to 150' in length, such as those which form the Shaw Farm Bridge, the SHC mandated "through Pratt Truss Bridges, with reinforced concrete floors" and a roadway width of at least 16'.¹⁰

Although the first standardized truss plans included both pin-connected and rigid-connected Pratt designs, the SHC soon phased out the former, so that by 1916 a close observer of SHC practice could remark that "the use of pin connected trusses has been completely abandoned."¹¹ This development reflected a growing consensus among American engineers that rigid-connected trusses were sturdier, especially for short spans, because they were less prone to vibration under live load.¹² For its rigid-connected designs, the SHC permitted either riveting or bolting of

⁹Robert S. Newbery, Jeffrey A. Hess, and Robert M. Frame III, Historic Highway Bridges of Wisconsin, vol. 2: Truss Bridges (Madison, WI: Wisconsin Department of Transportation, forthcoming); Wisconsin Highway Commission, "Steel Highway Bridge, Concrete Floor, 112'-0" Span, 16'-0" Roadway," Plan A15 (24 January 1912).

¹⁰Second Biennial Report of the Wisconsin Highway Commission. July 1, 1911, to January 1, 1915 (Madison, WI: Published by the State, 1915), 24.

¹¹Hans Nelson Brue, "The Development of Highway Bridges in Wisconsin," Civil Engineering Thesis, University of Wisconsin, 1916, 32.

¹²See, for example, F.C. Kunz, Design of Steel Bridges (New York: McGraw-Hill Book Company, Inc., 1915), 170.

field connections.¹³ The Shaw Farm Bridge offers an example of field riveting.

As noted in the historic highway-bridge context presented in volume 2 of Cultural Resource Management in Wisconsin: A Manual for Historic Properties, the SHC's standardized, through-Pratt truss designs fall into three general chronological categories: an early period (1911-1925) characterized by the use of relatively light steel sections for built-up compression and tension members; a middle period (1926-1931) which saw the use of somewhat heavier components for built-up compression and tension members; and a late period (1931-1936) which replaced built-up truss members with solid, rolled sections.¹⁴

According to Cultural Resource Management in Wisconsin, in 1981 the Historic Bridge Advisory Committee (HBAC) identified 123 Pratt overhead trusses in Wisconsin. Of these, forty-nine, including the Shaw Farm Bridge, represented the early period (1911-1925) of SHC standardized design. Of this group, the HBAC highlighted two bridges "as the best examples of Pratt overhead trusses from this period": the 112' Blomberg Road Bridge (P57-068), erected in 1914, and the 90' Leedel Mill Road Bridge (P53-066), erected in 1916. These bridges were granted National Register status on the basis of their representative qualities. By the summer of 1993, bridge-replacement projects had claimed the majority of the "early-period" bridges, leaving only fourteen in place. This number has been reduced even further by the loss of the Blomberg Road Bridge, which received HAER documentation as mitigation prior to its

¹³Brue, 22.

¹⁴Cultural Resource Management in Wisconsin: A Manual for Historic Properties (Historic Preservation Division, State Historical Society of Wisconsin, June 1986), vol. 2, transportation section 12, 12-16.

demolition.¹⁵ Although built later than the Blomberg Road and Leedel Mill Road bridges, the Shaw Farm Bridge is also significant as an excellent representative example of the SHC's early, rigid-connected, Pratt through truss, standardized plan. Despite over seven decades of service, the bridge retains all essential details of its original design.

The Shaw Farm Bridge, although constructed later than the two highlighted examples, features three spans of sizable length, and was fabricated by Wausau Iron Works, a prolific Wisconsin firm. Cultural Resource Management in Wisconsin notes that "this period is characterized by standard designs from State Highway Commission plans." It adds that "compression and tension members are generally built-up members from larger angles. The members are connected at riveted gusset plates." The Shaw Farm Bridge conforms to these conventions of the era.¹⁶ The bridge has been determined eligible for the National Register of Historic Places under Criterion C, for embodying "the distinctive characteristics of a type, period, or method of construction."¹⁷

The Shaw Farm Bridge is scheduled for replacement. This Historic American Engineering Record study has been completed as part of the Federal Highway Administration's responsibility

¹⁵The statistics on through Pratt truss attrition were compiled from: Cultural Resource Management in Wisconsin, vol. 2, transportation section 12, 6, 12-15; "Extant Pratt Overhead Trusses, 1911-1925, Sorted by Date of Construction," 18 June 1993, in WisDOT Staff Historian's Office, Madison, WI. The Blomberg Road Bridge is documented as HAER No. WI-66.

¹⁶Cultural Resource Management in Wisconsin, vol. 2, transportation section 12, 12-15; Richard W. Dexter to David Pantzlaff, 23 July 1992.

¹⁷National Register Bulletin 16A: How to Complete the National Register Registration Form (Washington, D.C.: National Register Branch, Interagency Resources Division, National Park Service, U.S. Department of the Interior, 1991), 36.

under Section 106 of the National Historic Preservation Act of 1966 and Section 4(f) of the Federal Highway Code.

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